I CLAIM:

1. A porous metal oxide semiconductor with a band gap of greater than 2.9 eV spectrally sensitized on its internal and external surface with one or more metal oxides with a band-gap of less than 2.9 eV or a mixture thereof.

2. Porous metal oxide semiconductor according to claim 1, wherein said porous metal oxide semiconductor with a band gap of greater than 2.9 eV is an n-type semiconductor.

3. Porous metal oxide semiconductor according to claim 1, wherein said metal oxides with a band-gap of less than 2.9 eV are selected from the group consisting of: vanadium(V) oxide, iron(III) oxide and copper(II) oxide.

4. Porous metal oxide semiconductor according to claim 1, wherein the molar ratio of said one or more metal oxides with a band-gap of less than 2.9 eV or a mixture thereof to said porous metal oxide semiconductor is in the range of 0.2 to 0.001 to 1.

5. Porous metal oxide semiconductor according to any of the preceding claims, wherein said porous metal oxide semiconductor further contains a phosphoric acid or a phosphate.

6. Porous metal oxide semiconductor according to claim 1, wherein said porous metal oxide semiconductor is nano-porous.

7. Porous metal oxide semiconductor according to claim 6, wherein said nano-porous metal oxide semiconductor with a band gap of greater than 2.9 eV is selected from the group consisting of titanium oxides, tin oxides, niobium oxides, tantalum oxides, tungsten oxides and zinc oxides

8. Porous metal oxide semiconductor according to claim 6, wherein said nano-porous metal oxide semiconductor with a band gap of greater than 2.9 eV is titanium dioxide.

9. A process for spectrally sensitizing a nano-porous metal oxide with a band-gap of greater than 2.9 eV on its internal and external surface comprising the steps of: providing a nano-porous metal oxide with a band gap of greater than 2.9 eV,

applying a solution of a metal compound or salt which upon pyrolysis or upon hydrolysis and subsequent pyrolysis yields a metal oxide with a band-gap of less than 2.9 eV and heating said nano-porous metal oxide oxide with a band-gap of greater than 2.9 eV to which said metal salt had been applied to pyrolyse or hydrolyse and subsequently pyrolyse said salt to said metal oxide with a band-gap of less than 2.9 eV.

10. Process according to claim 9, wherein said aqueous solution further contains a phosphoric acid or a phosphate.

11. Process according to claim 9, wherein said aqueous solution contains one or more further metal compounds or salts that pyrolyse or hydrolyse and subsequently pyrolyse to metal oxides with a band-gap of less than 2.9 eV.

12. A second process for spectrally sensitizing a nano-porous metal oxide with a band-gap of greater than 2.9 eV on its internal and external surface comprising the steps of: (i) preparing a solution containing a metal compound or salt that pyrolyses or hydrolyses and subsequently pyrolyses to a metal oxide semiconductor with a band-gap of greater than 2.9 eV and a metal compound or salt that pyrolyses or hydrolyses and subsequently pyrolyses to a metal oxide with a band-gap of less than 2.9 eV, (ii) adding a water-soluble polymer to the solution prepared in step (i), (iii) coating the solution prepared in step (ii) on a support, and (iv) heating the coated support prepared in step (iii) to a temperature at which said water-soluble polymer is no longer present in said coating support.

13. Second process according to claim 12, wherein said aqueous solution further contains a phosphoric acid or a phosphate.

14. Second process according to any of claim 12, wherein said aqueous solution contains one or more further metal compounds or salts that pyrolyse or hydrolyse and subsequently pyrolyse to metal oxides with a band-gap of less than 2.9 eV.

15. A photovoltaic cell comprising a porous metal oxide semiconductor with a band gap of greater than 2.9 eV spectrally sensitized on its internal and external surface with one or more

metal oxides with a band-gap of less than 2.9 eV or a mixture thereof.

16. Photovoltaic cell according to claim 16, wherein said porous metal oxide semiconductor with a band gap of greater than 2.9 eV is an n-type semiconductor.

17. Photovoltaic cell according to claim 16, wherein said metal oxides with a band-gap of less than 2.9 eV are selected from the group consisting of: vanadium(V) oxide, iron(III) oxide and copper(II) oxide.

18. Photovoltaic cell according to claim 16, wherein the molar ratio of said one or more metal oxides with a band-gap of less than 2.9 eV or a mixture thereof to said porous metal oxide semiconductor is in the range of 0.2 to 0.001 to 1.

19. Photovoltaic cell according to claim 16, wherein said porous metal oxide semiconductor further contains a phosphoric acid or a phosphate.

20. Photovoltaic cell according to claim 16, wherein said porous metal oxide semiconductor is nano-porous.

21. Photovoltaic cell according to claim 20, wherein said nano-porous metal oxide semiconductor with a band gap of greater than 2.9 eV is selected from the group consisting of titanium oxides, tin oxides, niobium oxides, tantalum oxides, tungsten oxides and zinc oxides

22. Photovoltaic cell according to claim 20, wherein said nano-porous metal oxide semiconductor with a band gap of greater than 2.9 eV is titanium dioxide.

23. A second photovoltaic cell comprising a porous metal oxide semiconductor prepared according to a process for spectrally sensitizing a nano-porous metal oxide with a band-gap of greater than 2.9 eV on its internal and external surface comprising the steps of: providing a nano-porous metal oxide with a band gap of greater than 2.9 eV, applying a solution of a metal compound or salt which upon pyrolysis or upon hydrolysis and subsequent pyrolysis yields a metal oxide with a band-gap of less than 2.9

eV and heating said nano-porous metal oxide oxide with a band-gap of greater than 2.9 eV to which said metal salt had been applied to pyrolyse or hydrolyse and subsequently pyrolyse said salt to said metal oxide with a band-gap of less than 2.9 eV.

24. Second photovoltaic cell according to claim 23, wherein said aqueous solution further contains a phosphoric acid or a phosphate.

25. Second photovoltaic cell according to claim 23, wherein said aqueous solution contains one or more further metal compounds or salts that pyrolyse or hydrolyse and subsequently pyrolyse to metal oxides with a band-gap of less than 2.9 eV.

26. A third photovoltaic cell comprising a porous metal oxide semiconductor prepared according to a process for spectrally sensitizing a nano-porous metal oxide with a band-gap of greater than 2.9 eV on its internal and external surface comprising the steps of: (i) preparing a solution containing a metal compound or salt that pyrolyses or hydrolyses and subsequently pyrolyses to a metal oxide semiconductor with a band-gap of greater than 2.9 eV and a metal compound or salt that pyrolyses or hydrolyses and subsequently pyrolyses to a metal oxide with a band-gap of less than 2.9 eV, (ii) adding a water-soluble polymer to the solution prepared in step (i), (iii) coating the solution prepared in step (ii) on a support, and (iv) heating the coated support prepared in step (iii) to a temperature at which said water-soluble polymer is no longer present in said coating support.

27. Third photovoltaic cell according to claim 26, wherein said aqueous solution further contains a phosphoric acid or a phosphate.

28. Third photovoltaic cell according to claim 26, wherein said aqueous solution contains one or more further metal compounds or salts that pyrolyse or hydrolyse and subsequently pyrolyse to metal oxides with a band-gap of less than 2.9 eV.